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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/445,044	12/01/1999	YOSHIO OHASHI	7246/58595	9396

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EXAMINER

GRAHAM, ANDREW R

ART UNIT	PAPER NUMBER
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2697

DATE MAILED: 04/14/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/445,044

Applicant(s)

OHASHI, YOSHIO

Examiner

Andrew R Graham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 1999 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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**DETAILED ACTION**

***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: a speaker frame (8) which is listed on line 10, page 2 of the specification. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Specification***

2. The disclosure is objected to because of the following informalities: \*\*\*

- page 10, line 25: the phrase "a cone paper" appears as if it would be better understood and more descriptively appropriate if it were rewritten as "a paper cone", "a cone-shaped paper", or something of a similar nature.
- page 14, line 26: the word "current" is misspelled as "current".

The applicant's assistance is requested in corrected any further discrepancies in the disclosure that are of a similar nature, but are not specifically listed above.

Appropriate correction is required.

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**Claim Rejections - 35 USC § 112**

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 1, 2, and 4** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In **Claim 1**, the formula on lines 13 and 14 is vague and indefinite because it fails to give a units value for the number "20000".

**Claim 1** recites the reference character "k2" in the formula that appears on lines 13 and 14. This reference character is vague and indefinite because "k2" is not defined in the paragraph that follows the formula that defines the other variables in the formula.

In **Claim 1**, the formula given on lines 13 and 14 includes the fraction "1/2" in the middle and at the end of line 13. From the given notation, it is unclear what the mathematical function of this fraction is intended to be.

**Claim 2** recites the limitation "the individual constants" on line 23 of page 22 in regards to "Ri, L1, N, R2, and k". In Claim 1, these variables are defined and not referred to as constants. Therefore, there is insufficient antecedent basis for this limitation in the claim.

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**Claim 2** recites the limitation "L12" in the formula on line 26 of page 22. This value is not defined in the claims.

**Claim 2** recites the limitation "N2" in the formula on line 26 of page 22. This value is not defined in the claims.

In **Claim 2**, the formula given on lines 26 and 27 of page 22 includes the fraction "1/2" at the end of line 26. From the given notation, it is unclear what the mathematical function of this fraction is intended to be.

In **Claim 2**, the formula on lines 26 and 27 of page 22 is vague and indefinite because it fails to give a units value for the number "0.3".

In **Claim 2**, the formula given on lines 1-3 on page 23 includes the constant "2" in the middle and at the end of line 1 and at the end of line 3. From the given notation, it is unclear what the mathematical function of this constant is intended to be.

**Claim 4** recites the limitation "the coupling coefficient" in line 22 of page 23. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the

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art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1 and 2** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujihira et al (JP-Pub. No. 06-292296) in view of Norris (USPN 6108433). Hereafter, "Fujihira et al" will simply be referred to as "Fujihira".

Fujihira discloses an inductive speaker system that uses two coils to magnetically induce and output an audio signal. The system includes a primary coil (5) positioned in a magnetic pole opening (11) (paragraphs 0020 and 0021). This coil is connected through lead wires (5a,5b) to an input cord (8) that receives the input audio signal (paragraph 0020). This coil and its connections read on "a primary coil disposed in the vicinity of a gap of a magnetic circuit and to which a current corresponding to an input audio signal is supplied". The system also includes a voice coil (12), which is also located in the magnetic pole opening (11) (paragraph 0023). A current is induced into this coil (12) by the input current that is supplied to the primary coil (5) (paragraph 0033). This coil and its response to the primary coil (5) read on "a secondary coil, disposed in the gap, for inducing a current corresponding to a current that flows in said primary coil". This coil (12) is connected to a dome shaped loudspeaker (15) that vibrates and thereby emits sound when the primary coil (5) induces a current in the secondary coil (12) (paragraph 0033). This reads on "a vibrating plate vibrated by said

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secondary coil with an interaction of the current induced by said secondary coil and a magnetic flux in the gap".

While the involved components are disclosed, Fujihira does not specify:

- that the involved components satisfy the formula:

$$N * (R1 * R2)^{1/2} / (2 \pi * L1 * (1 - k^2)^{1/2}) \geq 20,000$$

where R1 is the DC resistance of the given primary coil, L1 is the inductance of the given primary coil, R2 is the DC resistance of the given secondary coil, L2 is the inductance of the secondary coil, N is the number of turns of said primary coil, and k is the coupling coefficient of the given primary coil and secondary coil

Norris discloses a system of inductive, ultrasonic speakers. The system includes a conductive coil (30) that, by receiving a current, establishes a magnetic field that inducts a current in and causes the movement of a conductive ring (34) (col. 4, lines 8-25). Norris specifically intends for his speaker to be used in parametric speaker applications, which involves the emission of an input signal combined with an ultrasonic carrier wave (col. 8, lines 21-43). Regarding Claim 1, the first (leftmost) half of the equality involves a natural relationship between the components of the inductive, magnetic system. The system that Norris discloses includes the same or highly similar versions of the same components. The latter (rightmost) half of the given equation requires the system to operate at a frequency higher

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than the audible frequency range, a feature that is included in the system of Norris (col. 9, lines 20-23). Thus, the system of Norris reads on the given equation in Claim 1.

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to operate the speaker of Fujihira at ultrasonic frequencies as detailed by Norris. The motivation behind such a modification would have been the emission of ultrasonic frequencies would have widened the range of application for the speaker of Fujihira to other applications such as parametric speakers.

Regarding **Claim 2**, Norris discloses a system of inductive speakers that operate at ultrasonic frequencies (col. 9, lines 20-23). According to Claim 1, the frequency bands referenced by the "desired reproduction frequency band" in Claim 2 would have been in the ultrasonic frequency range. As detailed above, the notation of parts of the equation in Claim 2 leaves the operation of certain variables mathematically questionable. Thus, as best understood by the examiner, the operation of the system in the disclosed frequency band - and the associated relationships of the variables would have been included in the system of Norris, which reads on "the individual constants  $R_1$ ,  $L_1$ ,  $N$ ,  $R_2$ , and  $k$  satisfy the following formula at a frequency band  $f$  in a desired reproduction frequency band".

5. **Claims 3 and 4** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujihira in view of Hastings-James et al (USPN



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4300022). Hereafter, "Hastings-James et al" will simply be referred to as "Hastings-James".

Fujihira discloses an inductive speaker system that uses two coils to magnetically induce and output an audio signal. The system includes a primary coil (5) positioned in a magnetic pole opening (11) (paragraphs 0020 and 0021). This coil is connected through lead wires (5a,5b) to an input cord (8) that receives the input audio signal (paragraph 0020). This coil and its connections read on "a primary coil disposed in the vicinity of a gap of a magnetic circuit and to which a current corresponding to an input audio signal is supplied". The system also includes a voice coil (12), which is also located in the magnetic pole opening (11) (paragraph 0023). A current is induced into this coil (12) by the input current that is supplied to the primary coil (5) (paragraph 0033). This coil and its response to the primary coil (5) read on "a secondary coil, disposed in the gap, for inducing a current corresponding to a current that flows in said primary coil". This coil (12) is connected to a dome shaped loudspeaker (15) that vibrates and thereby emits sound when the primary coil (5) induces a current in the secondary coil (12) (paragraph 0033). This reads on "a vibrating plate vibrated by said secondary coil with an interaction of the current induced by said secondary coil and a magnetic flux in the gap".

While the involved components are disclosed, Fujihira does not specify:

- that the involved components satisfy the formula:

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$L1 / L2 = R1 / R2$ , where  $R1$  is the DC resistance of the primary coil,  $L1$  is the inductance of the primary coil,  $R2$  is the DC resistance of the secondary coil, and  $L2$  is the inductance of the secondary coil

Hastings-James discloses a multi-filar moving coil loudspeaker. In the disclosure, Hastings-James discloses the desired relationships between the various coils of the system as well as their equivalent circuits. The main embodiment discussed by Hastings-James includes coils that are substantially of identical lengths, which means that the coils then have substantially identical resistances (col. 2, lines 55-57). The discussed coils also have the substantially same number of turns, which means that they have the same inductances (col. 2, lines 57-59). Thus, the ratios of the resistances and inductances in the system are both unity, which reads on the equation of  $L1 / L2 = R1 / R2$  with the variables as defined above.

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to establish the component equalities of Hastings-James in the speaker system of Fujihira. The motivation behind such a modification would have been that the equalities would have enabled the input signal to be equally inducted as the signal output by the system.

Regarding Claim 4, the system discussed by Hastings-James involves the relationships between two single coils (col. 3, lines 24-29). As detailed above, the resistances of these coils in the

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teachings of Hastings-James are substantially equal (col. 2, lines 55-57). Thus, the ratio of the two resistances is unity. The reference to a single coil and the equivalent resistance relationships reads on "the square of the number of turns of said primary coil is equal to the ratio of the DC resistance  $R_1$  of said primary coil and the DC resistance  $R_2$  of said secondary coil".

### **Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Smith et al (USPN 5841272) discusses the preferred inductive relationship between two coils.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Graham whose telephone number is (703) 308-6729. The examiner can normally be reached on Monday-Friday (7:30-4:30), excluding alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly Williams, can be reached at (703) 305-4863. The fax number for the organization where this application or proceeding is assigned is 703-872-9314 for regular communications, and 703-872-9315 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

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